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GERIDO, DWAN A				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/507,030

**Applicant(s)**

BENDER ET AL.

**Examiner**

Dwan A. Gerido, Ph.D.

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 September 2004.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-38 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-38 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 08 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date 9/8/2004.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application.  
6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

Claims 2 and 3 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 2 and 3 are directed to pressing the microcomponent and line connections against one another by means of a lifting device; however, the limitations of claims 2 and 3 are identical to those of claim 1 with respect to the microcomponent, line connections, and lifting device.

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 8 recites the limitation "the frame" in line 2. There is insufficient antecedent basis for this limitation in the claim.
3. Claims 9, 15, and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 9 recites "a coding of the microcomponent connection system", it is unclear as to what applicant regards as the coding. Also, it is unclear as to how such coding enables the alignment of a microcomponent. For the purposes of examination, the coding will be interpreted as orientation of the microcomponent when placed into the connection system.
4. For claim 15, it is unclear as to what applicant means by "sprung electrical contacts". For purposes of examination, sprung electrical contacts will be interpreted as any spring mounted electrical contact.

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5. Regarding claim 17, it is unclear as to what applicant regards as the "design" for making projecting, electrically conducting, spring-loaded telescope contacts. For the purposes of examination, the design will be interpreted as any spring mounted electrical contact.

6. Claims 33-38 provides for the use of a microcomponent connection system, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claims 33-38 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-4, 6, 7, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Schwalbe et al., (WO 2001/089681).

9. For claim 1, Schwalbe et al., teach a microcomponent connection system comprising a mounting bracket (accommodation device) and a plurality of line connections in which the line

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connections are pressed against one another by a lifting device (page 11 paragraphs 6 and 7, figures 10 and 11).

10. For claim 2, Schwalbe et al., teach a microcomponent pressed against the connection lines by means of a lifting device (page 11 paragraphs 6 and 7, figures 10 and 11).

11. For claim 3, Schwalbe et al., teach the line connections pressed against the microcomponent by a lifting device (page 11 paragraph 7 line 1, figure 10 #85).

12. For claim 4, Schwalbe et al., teach a lifting device that is actuated manually by a lever (page 11 paragraph 7 lines 3-5).

13. For claim 6, Schwalbe et al., teach the microsystem with a plate (connection block) and line connections passed through the plate (page 11 paragraph 6 lines 1 and 2, figures 10 and 11 #'s 84 and 85), wherein the microcomponent is pressed in the direction of the connection block by a lifting device (page 11 paragraph 7 lines 3-5, figure 10 #'s 84 and 85).

14. For claim 7, Schwalbe et al., teach a system in which the microcomponent within an accommodation device is positioned by a reactor frame with the dimensions of the microreactor (page 11 paragraph 8 line 2).

15. For claim 9, Schwalbe et al., teach a system wherein the orientation (coding) of the fluid and electric lines enables alignment of an accommodated microcomponent.

***Claim Rejections - 35 USC § 103***

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

18. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

19. Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwalbe et al., (WO 2001/089681) in view of Bergh et al., (US 6,737,026).

20. With regards to claim 5, Schwalbe et al., teach a microcomponent connection system in which the lifting device is actuated by a lever (page 11 paragraph 7 lines 3-5). Schwalbe et al., do not teach a system wherein the lifting device is actuated by a pneumatic cylinder, electrically driven scissor jack, or an electric spindle drive. Bergh et al., teach a microreactor where the catalyst wafer is brought into contact with a manifold controlled by a pneumatic device (column 72 lines 5-13). It would have been obvious to one of ordinary skill in the art at the time the

invention was made to modify Schwalbe et al., in view of Bergh et al., to gain the advantage of providing a mechanical lifting device in order to operate the system independently of the user.

21. With regards to claim 8, Schwalbe et al., teach a system wherein the connection block, frame, and lifting device forms a slot on one side through which the microcomponent is accommodated (figure 11 #76).

22. Claims 10, 14, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwalbe et al., (WO 2001/089681) in view of Unno et al (US 2003/0021725).

23. With regards to claim 10, Schwalbe et al., teach a microcomponent connection system wherein the microcomponent system operates within an accommodation device is positioned by a reactor frame with the dimensions of the microreactor (page 11 paragraph 8 line 2). Schwalbe et al., do not teach the microcomponent having a recess, nor do they teach the frame of the microcomponent connection system having a projection to match the recess (paragraph 0033, figure 4 #'s 400, 452). Unno et al., teach a microfluidic device in which the device has corresponding recesses and projections placed on the body (microcomponent) and nesting structure (microcomponent connection system) respectively. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schwalbe et al., in view of Unno et al., to gain the advantage of providing a microcomponent configured to interface with a specific microcomponent connection system as taught by Unno et al.

24. With regards to claims 14 and 21, Schwalbe et al., teach a hollow ram that is axially movable in that it moves in conjunction with the lever mechanism that seals or releases plates from the connection system (page 11 paragraph 7 lines 3-5). Schwalbe et al., do not specifically teach a spring mounted hollow ram; however, it would have been obvious to one of ordinary

skill in the art at the time the invention was made to form a spring mounted hollow ram to provide flexibility of the microcomponent and fluid line structures in order to allow different pressures to be applied during the reaction process.

25. Claims 11 and 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schwalbe et al., (WO 2001/089681).

26. With regards to claim 11, Schwalbe et al., teach a microcomponent connection system comprising a mounting bracket (accommodation device) and a plurality of line connections in which the line connections are pressed against one another by a lifting device (page 11 paragraphs 6 and 7, figures 10 and 11). The device as taught by Schwalbe et al., is in electrical and fluid connection with various embodiments of the invention (, page 7, paragraph 4, page 8, paragraph 6 line 2); however, the accommodation device is only explicitly mentioned in fluid connection with the microcomponent (page 11 paragraphs 4 and 5, figure 9 #'s 36a, b). Schwalbe et al., do recite temperature sensors located on the accommodation device that are in electrical connection with a power supply thereby generating an indirect electrical connection between the microcomponent and the connection system (page 11 paragraph 3 lines 2-3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schwalbe et al., in a manner that placed both fluid and electrical contacts on the accommodation device to gain the advantage of providing control mechanisms in direct contact with the microcomponent in order to rapidly effect reaction parameters.



27. With regards to claim 12, Schwalbe et al., teach a fluid line connection extending through a fluid port which is being read on the claimed hollow ram (page 11 paragraph 10 line 1, figure 11 #'s 96 a, b, c).

28. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schwable et al., (WO 2001/089681) in view of Safir et al., (US 6,994,827).

29. With regards to claims 13 and 20, Schwalbe et al., teach a microcomponent connection system wherein the microcomponent system operates within an accommodation device is positioned by a reactor frame with the dimensions of the microreactor (page 11 paragraph 8 line 2). Schwalbe et al., do not teach the hollow ram as a concentrically arranged sealing ring around an aperture facing the microcomponent. Safir et al., teach a reaction vessel in which o-ring seals are positioned between the reaction vessel and its cover (column 14 lines 41-46). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schwalbe et al., in view of Safir et al., to gain the advantage of sealing the reaction chamber in order to perform reactions at pressures other than atmospheric pressure.

30. Claims 15, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwalbe et al., (WO 2001/089681) in view of Sarrine et al., (US 5,516,402).

31. With regards to claims 15, 16, and 17 Schwalbe et al., teach a microcomponent connection system comprising a mounting bracket (accommodation device) and a plurality of line connections in which the line connections are pressed against one another by a lifting device (page 11 paragraphs 6 and 7, figures 10 and 11). Schwable et al., do not teach the microcomponent connection system with electrical line connections having sprung or spring mounted electrical contacts. Sarrine et al., teach an electrophoresis device in which spring

loaded contacts are used for electrical connections to electrodes (column 8 lines 51-60). The limitations of claims 15, 16, and 17 are sufficiently broad that they do not overcome the prior art as listed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schwalbe et al., in view of Sarrine et al., to gain the advantage of providing an electrical input/output in order to use the microcomponent system in a variety of different reactions as taught by Sarrine et al.

32. Claims 18, 19, 24, 26-29, 31-33, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwalbe et al., (WO 2001/089681).

33. With regards to claims 18 and 19, Schwalbe et al., teach a microcomponent connection system comprising a mounting bracket (accommodation device) and a plurality of line connections in which the line connections are pressed against one another by a lifting device (page 11 paragraphs 6 and 7, figures 10 and 11 #'s 96 a-e). In addition, Schwable et al., teach various embodiments that include a range of control parameters including optical systems (page 9 paragraph 4). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schwalbe et al., in a manner that provides optical line connections in conjunction with the hollow ram in order to utilize the reactor with numerous chemical reactions and a variety of detection systems as taught by Schwalbe et al.

34. With regards to claim 24, the line connections as taught by Schwalbe et al., are located on plates that cover the top and bottom portions of the microcomponent. The device as taught by Schwalbe et al., reads on the instant claim in that the opposing connection (optical) lines would project over the channel section of the microcomponent on both sides (figures 10 and 11 #'s 96 a-e).

35. With regards to claim 26, it would have been obvious to one of ordinary skill in the art at the time the invention was made to place a opposite the optical line connection in order to illuminate the reactants and reaction products and to allow detection by the optical line connections without having light reflect off of the surface of the microcomponent.
36. With regards to claim 27, the line (optical) connections of Schwalbe et al., projects over a channel section of the microcomponent on both sides (figures 10 and 11 #'s 96 a-c).
37. With regards to claim 28, Schwalbe et al., teach a connection system wherein the lifting device has a support plate for the microcomponent (page 11 paragraphs 6 and 7, figures 10 and 11). Schwalbe et al., do not teach the support plate where the temperature of the plate is controlled by heating or cooling devices. Schwalbe et al do teach controlling the temperature of the microcomponent with a heat transfer fluid line (figure 6). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schwalbe et al., in a manner in which the temperature of the support plate is controlled by heating mechanisms in order to control temperature of the the reaction by applying heat directly to the microcomponent.
38. With regards to claim 29, Schwalbe et al., teach the connection system with additional control elements (page 9 paragraph 4).
39. With regards to claim 31, Schwalbe et al., teach accommodating a plurality of microcomponents connected in series to the line connections (page 3 paragraph 6 lines 1 and 2, paragraph 7).
40. With regards to claim 32, Schwalbe et al., teach a microcomponent connection system comprising a plurality of line connections. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schwalbe et al., in a manner wherein the

line connections are connected through connecting lines in order to ensure that the microcomponents arranged in the connection system are in fluid communication with each other (page 3 paragraph 5 line 1).

41. With regards to claim 33, Schwalbe et al., teach a microcomponent connection system for performing microfluid controlled chemical reactions (page 4 paragraph 3).

42. With regards to claim 37, Schwalbe et al., teach accommodating a plurality of microcomponents (page 3 paragraph 6 lines 1 and 2, paragraph 7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schwalbe et al., to distribute the sample material over the plurality of microcomponents in order to gain the advantage of performing reactions in parallel and increasing throughput.

43. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwalbe et al., (WO 2001/089681).

44. With regards to claim 22, Schwalbe et al., teach a fluid line connection extending through a fluid port which is being read on the claimed hollow ram (page 11 paragraph 10 line 1, figure 11 #'s 96 a, b, c). Schwalbe et al., do not teach the hollow ram in the shape of a cone. The MPEP states that changes in shape are a "matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed shape was significant". Because the cone shape of the instant claim is insignificant, the hollow ram as interpreted from Schwalbe et al., is being read on the instant claim. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the hollow ram in any shape that could be configured to fit within the microcomponent connection system.

45. With regards to claim 23, applicants do not list any specific materials or specific parameters concerning the elastic properties of the material used to make the hollow ram; therefore, the material as taught by Schwalbe et al., is being read on the claimed elastic material.

46. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schwalbe et al., (WO 2001/089681) in view of Corcoran et al., (US 2003/0180190).

47. With regards to claim 25, Schwalbe et al., teach Schwalbe et al., teach a microcomponent connection system comprising a mounting bracket (accommodation device) and a plurality of line connections in which the line connections are pressed against one another by a lifting device (page 11 paragraphs 6 and 7, figures 10 and 11 #'s 96 a-c). In addition, Schwable et al., teach various embodiments that include a range of control parameters including optical systems (column 13 lines 64-67). Schwalbe et al., do not teach the microcomponent system with a reflection layer in the region of a channel section. Corcoran et al., teach a microchamber with a light reflective coating in the chamber well (paragraph 0075). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schwalbe et al., in view of Corcoran et al., to gain the advantage of measuring the optical properties of the reaction product(s) in order to determine the chemical nature of the product(s).

48. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schwalbe et al., (WO 2001/089681) in view of Bostick et al., (US 4,263,406).

49. With regards to claim 30, Schwalbe et al., teach a microcomponent connection system comprising a mounting bracket (accommodation device) and a plurality of fluid line connections in which the line connections are pressed against one another by a lifting device (page 11 paragraphs 6 and 7, figures 10 and 11). Schwalbe et al., do not teach a frit arranged in the fluid

line. Bostick et al., teach a microreactor with a frit located in a fluid line (column 8 lines 1-3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schwalbe et al., in view of Bostick et al., to gain the advantage of filtering unwanted particles in order to prevent interference with the reactants, products, or the chemical reaction.

50. Claims 34, 35, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwalbe et al., (WO 2001/089681) in view of Andresen et al., (US 4,708,782).

51. With regards to claim 34, Schwalbe et al., teach a microcomponent connection system comprising a mounting bracket (accommodation device) and a plurality of fluid line connections in which the line connections are pressed against one another by a lifting device (page 11 paragraphs 6 and 7, figures 10 and 11). Schwalbe et al., do not teach a microcomponent connection system for electrophoretic separations and analysis. Andresen et al., teach a capillary type electrophoresis device for electrophoretic separations and analysis (column 4 lines 40-48). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schwalbe et al., in view of Andresen et al., to gain the advantage of separating charged particles in order to determine the size distribution of reaction products.

52. With regards to claim 35, isotachophoretic separations are a type of electrophoretic separation therefore it would have been obvious to one of ordinary skill in the art to include utilize isotachophoretic separations to gain the advantage of separating charged reaction products.

53. With regards to claim 38, the device as taught by Andresen et al., performs chromatographic separations (column 4 lines 40-48).

54. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schwalbe et al., (WO 2001/089681) in view of Tso et al., (US 6,613,560).

55. With regards to claim 36, Schwalbe et al., teach a microcomponent connection system comprising a mounting bracket (accommodation device) and a plurality of line connections in which the line connections are pressed against one another by a lifting device (page 11 paragraphs 6 and 7, figures 10 and 11). Schwalbe et al., do not teach a microcomponent connection capable of performing polymerase chain reactions (PCR). Tso et al., teach a microchamber/microreactor capable of performing PCR (column 5 lines 49-55, claim 13). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schwalbe et al., in view of Tso et al., to gain the advantage of performing multiple reactions simultaneously.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dwan A. Gerido, Ph.D. whose telephone number is (571)270-3714. The examiner can normally be reached on Monday - Friday, 9:00 - 6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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DAG

/Lyle A Alexander/

Primary Examiner, Art Unit 1797